Hybrid heat pumps: **A practical solution for lower energy bills**

June 2025

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The challenge of decarbonising home heating in the UK

The United Kingdom has made excellent progress in the fight against climate change, being the first major economy to halve its emissions. While this is a significant achievement, eliminating the remaining half will undoubtedly be harder. As the National Audit Office has recognised, decarbonising home heating represents one of the biggest outstanding challenges to Government in achieving net zero – with no easy answers available and consumers sceptical about switching to new technologies with which they are unfamiliar, and which will cost significant sums of money. Indeed, home heating accounts for 18 per cent of UK greenhouse gas emissions.

The previous Government therefore set a target of installing 600,000 heat pumps a year by 2028. By the end of 2023, however, the number actually installed was far below this and less than half of what was planned. Achieving the Government's target would need an elevenfold increase on the 55,000 heat pumps sold in 2022.

Installers, manufacturers of heat pumps and grid operators in the Netherlands have long argued that hybrid heat pumps could form an important part of the solution. Hybrids combine an existing combustion boiler with a small electric heat pump, and do so without the need for major modifications to a person's home. The heat pump element provides most of a home's heating needs, with the boiler component only kicking in for the few weeks of the year when it is exceptionally cold or as a backup should the power grid become overloaded.

The manufacturers involved in this study believe that hybrid heating systems offer a cost-effective solution for consumers while driving adoption of new technologies. These systems are expected to help build a robust electric heat pump supply chain, strengthen energy security, and lower emissions from homes. Crucially, hybrids provide the Government with the flexibility to shape the future heating network in the UK, as they can support either a predominantly electric or hydrogen-based system.

Hybrids are also compatible with the stated aims of the newly elected Government in the UK. While we await details of the Warm Homes Plan, the Government has made a welcome manifesto pledge to not force anyone to rip out their existing gas boilers. Hybrids could therefore go a long way in reducing emissions, while retaining the gas boiler element that consumers are familiar and comfortable with.

Over recent months and years, the Government has confirmed that it believes "hybrid heat pumps can play an important role in heat decarbonisation". We recognise, however, that further policy support for hybrids is dependent on further evidence and technological developments.

To that end, Vereniging voor Duurzame Warmte (Association for Sustainable Heat), working with the main industry partners in the Netherlands, has carried out a study on the impact of hybrids in 200 homes, over two winters. This report outlines the findings of that study, and will, we hope, form an important part of the evidence base as to the effectiveness of hybrids in reducing emissions, and achieving the Government's goal of becoming a clean energy superpower.

Government of the Netherlands

The findings of the Netherlands trial, where the housing stock is similar from that in the UK:

On average, there was a 75 per cent reduction in gas, and therefore CO2 emissions

On average, the annual energy cost to households dropped by around €1,000 (equivalent to £653 in the UK)

This report outlines the background to the trial, details the findings, and outlines the advantages that hybrids can bring – to the consumer, to the Government, and to the cause of tackling climate change.

About hybrid heat pumps

As defined by the Energy Saving Trust, a hybrid heat pump refers to a system that uses a standard heat pump alongside another heat source, usually a gas, oil or LPG boiler. Modifications to the home or heating system are not required, meaning that a hybrid requires far less intervention in a home than an all-electric heat pump, and takes up a much smaller space (avoiding, for example, the need for a large hot water storage vessel to be installed).

What has the Government said about hybrids to date?

Policy clarity is urgently needed on the role that hybrids can play within the Government's home decarbonisation strategy. In its 2025 consultation on *'Raising product standards for space heating',* the Government said that it "believes that hybrid heat pumps can play an important role in heat decarbonisation" – adding that hybrids can reduce both energy bills and fossil fuel use. It also noted that hybrids "allow a more gradual transition for consumers".

Hybrids are not currently included in the Government's Boiler Upgrade Scheme, which provides grants to consumers looking to decarbonise their home heating systems. However, the Government said it would "continue to review the financial support available to reduce capital costs of hybrid installations for consumers and whether this is sufficient". Despite this, in its recently published consultation on the Boiler Upgrade Scheme, *('Stimulating further demand for heat pumps and enhancing consumer protections')*, the Government proposed to continue the exclusion of hybrids.

Ultimately, "no decision has been taken" by the Government "on the long-term role of hybrids without the decarbonisation of heat and on policies to support the widespread uptake over hybrids". That said, Minister Miatta Fahnbulleh affirmed in Parliament that *"hybrid heat pumps… have the potential to play an important role in heat decarbonisation."*

The Government is expected to publish its Warm Homes Plan later this year. In Opposition, it had promised to deploy £6.6 billion through grants and loans to upgrade five million homes, including with low carbon heating.

Hybrid study: Two winters with two hundred hybrids

Background to the study

In order to increase the evidence base available on the benefits of hybrids, a demonstration study was undertaken in the Netherlands.

The objective of the study was to determine the effect of installing hybrids in 174 homes that varied in terms of age and type.

The main research questions were:

How much gas consumption decreased after the installation of the hybrid?

How much energy bills decreased for consumers after the installation of the hybrid?

The study was funded by the Dutch government and conducted by the Smart Energy Foundation on behalf of key organisations and manufacturers. These included: Techniek NL, the Dutch Enterprise Agency, Vereniging voor Duurzame Warmte, Intergas, Remeha, Bosch, Vaillant, and Ferroli. These groups, part of the Sustainable Heat Association, worked together to assess the impacts of hybrid heating system. The Dutch Ministry of Housing will share the study's results with the Dutch Parliament.

Participants in the trial could apply through an open website, as well as being recruited through the manufacturers' installer network. Applications involved an online form and the submission of two energy annual accounts prior to the installation of the hybrid. For several reasons, including related to Covid-19, the final number of homes which participated in the project was 174. The average year of construction for participating homes was 1974.

The vast majority of the participants in the trial owned their home. The homes were not structurally altered, and the hybrid used was selected by the resident and/or the installer. A measurement set was developed for the study that collected the required information, regardless of the manufacturer of the appliance. Through the measurement set, energy flows and temperatures in the homes were measured and transmitted via a mobile network connection so that data analysis could be undertaken.

The project studied the difference in the energy use of the home before the installation of a hybrid, compared with afterwards. Energy use was known for two years prior to the installation of a hybrid, and for two winters with a hybrid. In general, home use, such as hot water use or thermostat settings, remained fairly constant over time. A majority of participants did not change their heating behaviour after the placement of the hybrid. Almost all participants reported being content with the heat produced by the hybrid.

This study is an initiative of: Intergas, Bosch, Vaillant, Ferroli, Remeha, Techniek NL and Dutch Enterprise Agency.

BOSCH

demoprojecthybride.nl

Techniek Nederland

Vaillant

Ferroli

UNIVERSITY OF TWENTE.

remeha

All the statements have been scientifically audited by the University of Twente.

The results

While these results concern the study that was undertaken in the Netherlands, the lessons learned can be applied consistently to the UK.

Headline results:

— Average gas savings were 74.83%

— Prior to installing hybrid systems, Dutch homes in the study consumed an average of 18,317 kWh of gas per year.

— Hybrid systems reduced gas usage by approximately 74.83%, translating to an average gas saving of 13,677 kWh per household annually. Average net savings to the consumer were €1,017.88

— The average bill for heating was €2,545.62 a saving on the energy bill of almost 40% (Net savings = gas savings – the cost of running the electric hybrid)

— This saving is based on the average of the June 2024 tariffs of €1.33 for a m3 of gas in the Netherlands, and €0.31 for a kWh of electricity.

Calculated to the energy prices of the UK, this would mean:

— If UK households achieve similar reductions, each home could save around 13,754 kWh of gas annually, translating to a cost reduction of about £1,266 at current UK gas prices (£0.90 per m^3).

— Factoring in the electricity use of the hybrid (2,500 kWh at £0.245 per kWh, totaling £612.50), the net savings for a typical UK household would be approximately £653 per year.

Other findings from the study:

Hybrid heat pumps exceeded expectations by using less electricity than anticipated. They demonstrated an average efficiency (COP) of 3.8, meaning they produced 3.8 units of heat for every unit of electricity consumed, and their gas savings were 5.7 times greater than the electricity they used. This is especially important for UK consumers, due to the increasing concern around strain on the grid, particularly during peak demand times. By maintaining a lower-than-expected demand on the grid, even on very cold days, as low as -5°C, hybrid systems proved to be both reliable and efficient in challenging conditions. For consumers, this means they can benefit from reduced energy costs and improved heating performance without overburdening the grid, offering peace of mind during cold snaps and energy price fluctuations.

Hybrids are capable of meeting the entire heating demand. In 55 homes in the study, more than 95 per cent of the heating demand was met by the hybrid. In four homes, the hybrid took over the heating demand completely for the two winters studied.

Hybrid heat pumps work effectively in homes even with poor insulation. In 2020, over 90 percent of UK homes had central heating systems with radiators, making hybrid heat pumps a practical solution for the vast majority of households. In fact, hybrid heat pumps can offer an advantage in these homes, as they operate at lower water temperatures. This means the pipes and radiators heat up less, which reduces unnecessary heat loss into the structures of buildings. For consumers, this translates into greater efficiency, as more heat is directed where it's needed—inside the living spaces—rather than being lost through the heating system itself, helping to lower energy bills and improve comfort.

Installation is key to effective performance. The study found that installation quality varied, which affected the performance of hybrid heat pumps. This underscores the importance of having well-trained and knowledgeable installers to ensure the technology operates as efficiently as possible. For the UK to fully embrace hybrid heat pump systems and achieve their potential energy and cost savings, a skilled workforce is essential.

The potential of hybrids in the decarbonisation of home heating

Hybrid systems are cheaper for consumers. Hybrids are cheaper to install than fully electric heat pumps, and their cost will fall further in the future if a competitive market is allowed to develop in the UK. As demonstrated by the study in the Netherlands, net savings of more than €1,000 (equivalent to £653) were made when households switched to hybrids, a decrease of more than 40% on their yearly energy bill.

Hybrids will drive much-needed consumer change. Fully electric heat pumps are unfamiliar to most consumers – Government research found that just 23 per cent of the population knew even "a little" about heat pumps. Hybrids take technology consumers have long been familiar with – the combustion boiler – and combine it with a heat pump. Ease of installation, lower costs and excellent performance mean they can act as a stepping-stone, not just to electric heat pumps, but to hydrogen systems as well in the longer-term. They allow a more gradual progression away from the current heating systems, which could help in shifting consumer preferences.

Hybrid installations will result in less disruption for consumers. Hybrids can be adapted to work with existing boilers, which means lower costs and less disruption for consumers. They also don't need hot water storage vessels, as heat pumps do, which are large and often require homes to be reconfigured.

Hybrids will reduce emissions and help achieve Net Zero. Compared to combustion boilers, in the study in the Netherlands, gas usage was reduced, on average, by 75 per cent.

Hybrids will build a UK supply chain and skills base. The supply chain for heat pumps in the UK is relatively underdeveloped. If the Government is to achieve its ambition of 600,000 heat pump installations by 2028, it must rapidly develop the supply chain and installer skills needed to support this. A significant role for hybrids would contribute towards the continued growth of the heat pump supply chain and support growth in UK manufacturing of low-carbon appliances, and upskilling of the installer base as many of the skills required to install hybrids are the same as those needed for standalone heat pumps. As an evolution of the condensing boiler, the hybrid represents a huge opportunity for the British heating industry, as existing boiler manufacturers can also make hybrids – securing jobs in the long term.

Hybrids will enhance the UK's energy security. Hybrids can switch between a combustion boiler and heat pump element. This means that at times of electricity demand, hybrids can switch to combustion, and vice versa when electricity is cheaper off-peak. This avoids the need to dramatically increase the electricity grid in order to cater for heating, as well as benefiting consumers with cheaper bills.

Hybrids provide flexibility for the future. The Government does not yet know if future home heating will be based around electricity (in the form of heat pumps), or hydrogen (in combustion boilers), or both. Only hybrids can allow for all of these outcomes. If electrification is the answer, the heat pump element of a hybrid can be used with battery technology and storage, so gas is no longer needed. If hydrogen is the answer, hybrids can easily be converted so that the combustion element runs on hydrogen, and indeed hydrogen hybrids are ready to be deployed in trials in the Netherlands.

Policy asks of Government

The study in the Netherlands has demonstrated hybrids can significantly reduce gas usage and consumer bills. Vereniging voor Duurzame Warmte is happy to make its full, detailed findings and data available to the Government in the UK as it builds an evidence base.

Vereniging voor Duurzame Warmte is therefore calling on the Government to:

We are therefore calling on the Government to:

Support the rollout of hybrids by making them eligible for support under the Boiler Upgrade Scheme, making them cheaper for consumers to install.

Including hybrids as part of the forthcoming Warm Homes Plan, meaning people can benefit from support without having to rip out their boilers, as the Government's manifesto promised.

Set out the long-term role for hybrids ahead of 2026, giving the market and consumers confidence and certainty over the future of home heating.

A report produced with support from the Sustainable Energy Foundation

June 2025